



GB04/4356



INVESTOR IN PEOPLE

The Patent Office
Concept House
Cardiff Road
Newport
South Wales
NP10 8QQ

REC'D 28 OCT 2004

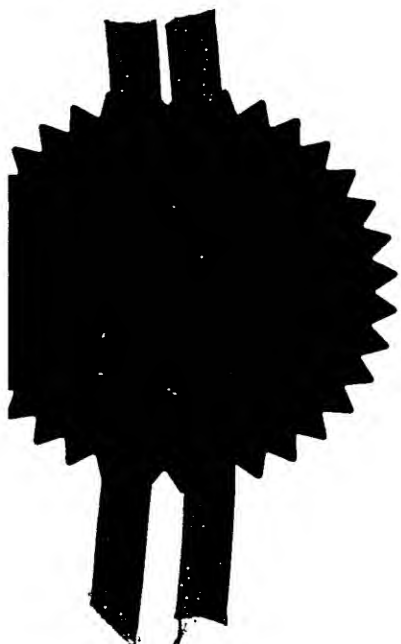
WIPO PCT

I, the undersigned, being an officer duly authorised in accordance with Section 74(1) and (4) of the Deregulation & Contracting Out Act 1994, to sign and issue certificates on behalf of the Comptroller-General, hereby certify that annexed hereto is a true copy of the documents as originally filed in connection with the patent application identified therein.

In accordance with the Patents (Companies Re-registration) Rules 1982, if a company named in this certificate and any accompanying documents has re-registered under the Companies Act 1980 with the same name as that with which it was registered immediately before re-registration save for the substitution as, or inclusion as, the last part of the name of the words "public limited company" or their equivalents in Welsh, references to the name of the company in this certificate and any accompanying documents shall be treated as references to the name with which it is so re-registered.

In accordance with the rules, the words "public limited company" may be replaced by p.l.c., plc, P.L.C. or PLC.

Re-registration under the Companies Act does not constitute a new legal entity but merely subjects the company to certain additional company law rules.



Signed *Andrew Gurney*
Dated 19 October 2004

PRIORITY DOCUMENT
SUBMITTED OR TRANSMITTED IN
COMPLIANCE WITH
RULE 17.1(a) OR (b)

BEST AVAILABLE COPY

Patents Act 1977
(Rule 16)

14 OCT 2003



1 / 77

Request for grant of a patent

(See the notes on the back of this form. You can also get an explanatory leaflet from the Patent Office to help you fill in this form)

The Patent Office

Cardiff Road
Newport
South Wales NP10 8QQ

1. Your reference DAG/P503722GB

2. Patent application number
(The Patent Office will fill in this part)

0324060.3

15OCT03 E844540-4 000335

3. Full name, address and postcode of the or of each applicant (underline all surnames)

Rentokil Initial UK Limited
Felcourt,
East Grinstead
West Sussex RH19 2JY

P01/7700 0.00-0324060.3

Patents ADP number (if you know it)

07556566001

If the applicant is a corporate body, give the country/state of its incorporation

4. Title of the invention Pest Detection Apparatus

5. Name of your agent (if you have one)

W.P.THOMPSON & CO.

"Address for service" in the United Kingdom to which all correspondence should be sent (including the postcode)

55 Drury Lane
London
WC2B 5SQ

Patents ADP number (if you know it)

158007 ✓

6. If you are declaring priority from one or more earlier patent applications, give the country and the date of filing of the or of each of these earlier applications and (if you know it) the or each application number

Country Priority application number Date of filing
(if you know it) (Day/month/year)

7. If this application is divided or otherwise derived from an earlier UK application, give the number and the filing date of the earlier application

Number of earlier application Date of filing
(Day/month/year)

8. Is a statement of inventorship and of right to grant of a patent required in support of this request? (Answer 'yes' if:
a) any applicant named in part 3 is not an inventor, or
b) there is an inventor who is not named as an applicant, or
c) any named applicant is a corporate body.
See note (d))

YES

DUPLICATE

Pest Detection Apparatus

The present invention relates to pest detection apparatus and in particular to an arrangement which seeks to both detect and retain a pest so that it can be subsequently inspected.

5

Such apparatus is commonly used for pest control and as part of a pest control service.

10 In providing a pest control service, a contractor is generally required to provide regular service visits to a client's site in order to inspect for the presence of any pests and to carry out any pest control measures found to be necessary. As an example a technician might normally visit a client once every four to eight weeks for this purpose
15 although a substantial number of these visits may result in no further pest control measures being required.

In the event that evidence of pest activity is discovered during the interval between service visits, a
20 client may have the option to request an additional visit from a technician in order to address the problem. However, especially in premises which are not continuously occupied or continually inspected, a pest could conceivably be at large and undetected for some time in between routine
25 visits. This is particularly disadvantageous since even a relatively temporal incidence of pests has the potential of causing severe problems such as the spreading of diseases or otherwise damaging the client's business.

30 The present invention seeks to provide for pest detection apparatus having advantages over known such apparatuses. Further, there exists an opportunity for a

contractor to improve the level of service offered by using a device which detects the presence of pests on a client's premises and automatically alerts either the client or the contractor. A technician can be sent out in direct response
5 to a detection and thus the period during which the pest is at large can be considerably reduced.

It is a yet further aim of the present invention to increase the efficiency of the detection and control of
10 pests. It will be understood that by employing a device to signal detection of a pest, it is possible for the contractor to reduce the number of unnecessary inspection visits without increasing the likelihood that the presence of pests will go unnoticed. Furthermore the task of
15 inspecting an entire premises may be reduced to the inspection of a number of pest detection apparatus and the time and effort expended by the contractor may be decreased.

Especially in the case of insect pests, it may not be
20 evident which specific type of pest is present. The effective control of different types of insects requires different measures to be taken and so, upon being called out by a client, a technician may be required to carry out an inspection in order to try to determine which of a range
25 of control measures is most suitable. Such a situation is prevalent when a pest has been seen by a client or detected by a device and has subsequently evaded capture. Hence the present invention seeks to offer particularly effective pest detection apparatus by providing means for increasing the
30 probability of accurately detecting and trapping any pest which enters the detection device.

According to the present invention there is provided pest detection apparatus comprising, an entrance portion, an
35 entrapment portion accessible via the entrance portion,

detection means for detecting the presence of a pest once in the region of the entrapment portion, means for indicating detection of a pest by the detection means, and inspection means arranged to allow for viewing of a trapped pest.

5

Advantageously the entrance portion may be arranged to guide a pest towards the entrapment portion.

According to a preferred embodiment the apparatus includes a surface portion disposed between the entrance portion and the entrapment portion such that a region of the surface portion may alternatively be arranged, either to encourage a pest to traverse thereover, or to discourage a pest from traversing thereover.

15

Preferably the entrance portion leads to a tunnel member, such that at least one region of the tunnel member has a roughened surface texture and/or at least one region of the tunnel member has a smooth surface texture. The frictional properties of the smooth surface serve to offer minimal grip to a pest and thus discourage it from attempting to cross thereover, whilst the rough surface conversely encourages a pest to cross thereover by offering ample grip.

25

Providing a tunnel-shaped entrance portion in this manner is advantageous in that a pest can unwittingly be guided along a particular path in order to increase the chance that it will access the entrapment portion in such a manner as to be acutely susceptible to entrapment. Since this manner of operation relies on the natural intuition of the pest it is further beneficial that the probability of trapping a pest is increased without the need to employ any potentially costly features such as, for example, further mechanical parts.

35

Optionally the entrapment portion comprises an adhesive material provided an adhesive coated surface. Advantageously the adhesive material may be removably and replaceably positioned within the entrapment portion.

The adhesive material may be provided as an adhesive surface on a removable piece of card and preferably the adhesive material comprises a glue.

The entrapment portion may alternatively comprise a mechanical trap.

According to one embodiment of the present invention, the detection means may comprise at least one emitter/detector pair, which may optionally be arranged such that radiation extending between a emitter/detector is broken by a pest.

Favourably the at least one emitter/detector pair may be mounted relative to the entrapment portion such that a pest is detected once the pest has passed sufficiently far over the periphery of the adhesive material to make it unlikely that it will escape.

The radiation beam may optionally be an infra red beam.

The alerting means may usefully be activated when the radiation beam is broken.

As will be appreciated, the positioning of at least one emitter/detector pair in such a manner relative to the entrapment means allows for an advantageously simplistic and cost-effective manner of increasing the likelihood of retaining a pest without detection as opposed to detecting

a pest without retention.

Preferably the means for indicating the detection of a pest is arranged to provide a signal which may be audible
5 and/or visual, or a data signal which can be arranged to be transmitted to a remote location.

Optionally the inspection means may be transparent or, according to an alternative embodiment, the inspection means
10 may comprise a movable portion of the pest detection apparatus, which is movable to allow for the aforesaid inspection.

The provision of alerting means combined with
15 simplistic inspection means would advantageously allow even an unskilled man to monitor and inspect the apparatus.

Furthermore the occurrence of a situation whereby a technician is called out to a client without being able to
20 identify the required treatment, or whereby an inspection is required to find out the type of pest at hand, causes wasted time and resource and is clearly inconvenient to both the client and the contractor. Therefore, in addition to increasing the chance of trapping a pest, it is a further
25 favourable attribute of the present invention that the chance of detecting a pest without retaining it, is less likely than the chance of retaining a pest without detecting it. In the latter of these situations, a technician would be able to check an apparatus as part of a routine visit, as
30 opposed to being called out by the client, and quickly identify what type of pest is present in order to select an appropriate control measure, with a minimal disruption to the client's business.

35 The detection apparatus is further beneficial in

providing for a cost effective and reusable means for identifying the presence of a pest. Such simplistic detection and entrapment means are made effective by guiding a pest to the entrapment portion in a predictable manner.
5 As a result, the reliability of the entrapment and detection means is increased.

The above aspects of the present invention are all advantageous in that the pest detector apparatus comprises
10 a relatively small and readily portable device which can be easily positioned in any particular location and transferred as required between different locations without requiring connection to an external power source.

15 The invention is described hereinafter, by way of example only, with reference to the accompanying drawings in which:

Fig. 1 is a perspective wireframe view of pest detector
20 apparatus embodying one aspect of the present invention;

Fig. 2 is a side view of a tunnel member according to Fig. 1;

Fig. 3 is a perspective wireframe view of one region of the tunnel member of Fig. 2; and

25 Fig. 4 is a perspective wireframe view of pest detection apparatus embodying one aspect of the present invention with the lid pivoted into an open position.

With reference to the drawings, there is illustrated
30 one particular embodiment of a pest detection apparatus 2 according to one aspect of the present invention in which a tunnel section 4 of substantially rectangular cross-section is positioned adjacent to a compartment 6 such that both the tunnel section 4 and the compartment 6 share a common inner
35 wall 8. An outer wall 10, a floor 12 and a section of the

Lid 14 enclose the tunnel section 4, which is open-ended.

The lid 14 is attached by hinges 16 to the outer wall 10 and extends such that it also completely covers the compartment 6 when in the closed position as shown in Fig. 1. A catch 18 may be used to secure the lid 14 in the closed position which, when released, allows the lid 14 to pivot about the hinges 16 into an open position so as to expose the tunnel section 4 and the compartment 6, as shown in Fig. 4. A special key, such as a two pronged key, may optionally be required to unlock the catch 18 so that the pest detection apparatus 2 can be made 'tamper-proof'.

The floor 12 of the tunnel section 4 has a rough finish whilst the other three surfaces enclosing the tunnel section 4, as defined by the inner wall 8, the outer wall 10 and a portion of the lid 14, all have a very smooth, polished finish.

Positioned within the tunnel section 4 is the arrangement illustrated with reference to Fig. 3, whereby an adhesive-coated card 20 covers the central section of the tunnel floor 12 such that the adhesive coating covers the upper surface of the card 20 and so extends at right angles between the inner wall 8 and the rear wall 10 of the tunnel. Mounted on the rear wall 10 above the adhesive-coated card 20 are two infra red emitters 20, facing two corresponding infra red detectors 24 on the inner wall 8.

Additionally a smooth surface (not shown) may optionally be provided immediately adjacent the edge of the adhesive, either within the material of the tunnel floor (12), on the card (20) itself, or as a masking membrane over the edge of the adhesive.

35

The compartment 6 houses the batteries and electronic circuitry (not shown) required to drive the pest detection apparatus 2 so that it may be positioned as required without the need for connection to an external power source. The apparatus is then primed by closing the lid 14, or by any other suitable means such as activation switch or button.

The pest detection apparatus is likely to be most effective in capturing small animals of the phylum Arthropoda but may also be similarly used with other pests such as rodents.

Pests enter the tunnel section 4 from either of the open ends and can readily walk along the floor 12 up to an edge 26 of the adhesive-coated card 20. The roughened floor 12 allows it to be easily gripped by a pest as opposed to the smooth walls and ceiling of the tunnel which reduce a pest's affinity for these surfaces. Therefore upon entering the tunnel 4, a pest is discouraged from walking along any surface except for the floor 12, thereby reducing the likelihood of it evading detection and capture.

The pest is likely to cross over one of the two edges 26 of the adhesive-coated card 20, depending upon the end of the tunnel section 4 that is entered and upon doing so, it will become stuck fast to the card 20 by way of the adhesive material. Dependent on the size of the pest, it will pass a small distance over one of the edges 26 before being inhibited from further movement. Therefore the emitter/detector pairs are positioned such that a beam 28 extending between each emitter 22 and corresponding detector 24 passes over a section of the adhesive-coated card 20, a sufficient distance away from the edge 26 that a pest breaking the beam 28 is far enough onto the adhesive to be unlikely to escape.

It is foreseeable that a pest may only become partially stuck to the adhesive, such that one or more of its legs are free to move. In this situation it is likely that the pest will attempt to free itself by pulling away from the adhesive using its loose limbs. The likelihood of a pest being successful in freeing itself can be greatly reduced by the provision of a smooth surface immediately adjacent the edge of the adhesive, such that the pest cannot attain the grip required for this purpose.

10

The breaking of the beam 28 triggers the detection of the pest and a readily detectable signal is provided via an LED 30 positioned in clear view on the lid 14 which can be detected by anyone located either temporarily or permanently in the vicinity of the apparatus 2. The pest is maintained on the adhesive-coated card 20 until the lid 14 is opened in order to allow for inspection. The card 20 may then be removed and disposed of along with the trapped pest.

20

Although an adhesive trap is described in relation to the present embodiment, the juxtaposition of different types of surface may also be used to guide a pest in order to make it particularly susceptible to detection and entrapment using a known mechanical trapping system. A mechanical trap may trigger, or may be triggered by, the detection of the pest in order to ensure that a detected pest does not avoid entrapment.

The pest detection apparatus may optionally be repositioned for further use and is made ready again by inserting a new piece of adhesive coated card 20, closing the lid 14 and resetting the detector.

Of course, it should be appreciated that the present invention is not restricted to the details of the foregoing

embodiment and numerous options are available for its modification. The tunnel has been described as having rectangular cross section for illustrative purposes but may comprise any number of sides and variations of surface properties in order to encourage or discourage a pest from a particular mode of traversing. It is intended that the tunnel also be tapered (not shown) to improve the effectiveness of the apparatus. In order to minimise the risk of accidental or malicious triggering of the detector mechanism, the shape of the tunnel could be altered and one such embodiment might include a detector mechanism which is not accessible on a straight line path from an entrance portion. The number of emitter/detector pairs as well as their orientation relative to the adhesive coated surface can be altered to allow for particular types of pest.

Furthermore it will be clear to the skilled man that the adhesive properties of the adhesive material need not be uniform along its length and could be tailored to allow a pest to travel either greater or lesser distances over the edge of the card in order to improve the chances of detection.

Whilst a currently preferred embodiment involves alerting means in the form of an activated LED, it is envisaged that upon detection of a pest, the apparatus could alternatively output a signal to either of a client or a contractor. Thus the process leading to the identification of a trapped pest could be further automated, reducing the chance of a trapped pest going unnoticed.

CLAIMS

1. Pest detection apparatus comprising;
an access portion;
5 an entrapment portion accessible via the access
portion;
detection means for detecting the presence of a pest
once in the region of the entrapment portion;
means for indicating detection of a pest by the
10 detection means; and,
inspection means arranged to allow for viewing of a
trapped pest.
2. An apparatus as claimed in Claim 1, wherein the access
15 portion is arranged to guide a pest towards the entrapment
portion.
3. An apparatus according to Claim 1 or 2, including a
surface portion disposed between the access portion and the
20 entrapment portion.
4. An apparatus as claimed in Claim 3, wherein a region of
the surface portion is arranged to encourage a pest to
traverse thereover.
25
5. An apparatus as claimed in Claim 3, wherein a region of
the surface portion is arranged to discourage a pest from
traversing thereover.
- 30 6. An apparatus according to any one of preceding claims,
wherein the access portion leads to a tunnel member, such
that at least one region of the tunnel member has a
relatively roughened texture and at least one further
section of the tunnel member has a relatively smooth
35 texture.

7. An apparatus according to any one of the preceding claims, wherein the entrapment portion comprises an adhesive material provided as an adhesive coated surface.

5

8. An apparatus according to any one of the preceding claims, wherein the adhesive material is removably and replaceably positioned within the access portion.

10 9. An apparatus according to Claim 8, wherein the adhesive material is provided as an adhesive surface on a removable card.

15 10. An apparatus according to any one of the preceding claims, wherein the adhesive material is a glue.

11. An apparatus according to any one of claims 1 to 6, wherein the entrapment portion comprises a mechanical trap.

20 12. An apparatus according to any one of the preceding claims, wherein the detection means comprises at least one emitter/detector.

25 13. An apparatus according to Claim 11, wherein the at least one emitter/detector pair is arranged such that a radiation beam extending between each emitter/detector is broken by a pest.

30 14. An apparatus as claimed in Claim 12 or claim 13, wherein the at least one emitter/detector pair is mounted relative to the entrapment portion such that a pest is detected once the pest has passed over an edge of the entrapment portion.

35 15. An apparatus as claimed in Claim 13 or 14, wherein the

radiation beam is an infra red beam.

16. An apparatus according to any one of the preceding claims, wherein the means for indicating the detection of a
5 pest by the detection means is arranged for an audible and/or visual signal.

17. An apparatus according to any one of Claims 1 to 15,
wherein the means for indicating the detection of a pest by
10 the detection means is arranged to transmit a data signal to a remote location.

18. An apparatus according to any one of the preceding claims, wherein the inspection means is transparent.

15

19. An apparatus as claimed in any one of claims 1 to 17, wherein the inspection means comprises a movable portion of the pest detection apparatus.

20. An apparatus according to any one of the preceding claims wherein the apparatus comprises an enclosure structure having a tunnel portion and a housing portion for housing electronic circuitry, and which is arranged such that a lid member covers at least the tunnel region when
25 disposed in a closed position and exposes at least the tunnel portion when disposed in an open position.

21. An apparatus according to Claim 20, wherein the lid is provided with a tamper-proof catch.

30

Abstract

5 A pest detection apparatus which signals the detection
of a pest and subsequently retains the pest for the purpose
of inspection. An entrapment portion is accessible via an
entrance portion such that detection means detects the
presence of a pest in the region of the entrapment. The
10 apparatus is likely to be most effective in capturing small
animals of the phylum Arthropoda but may similarly be used
with other small pests such as rodents.

1/2

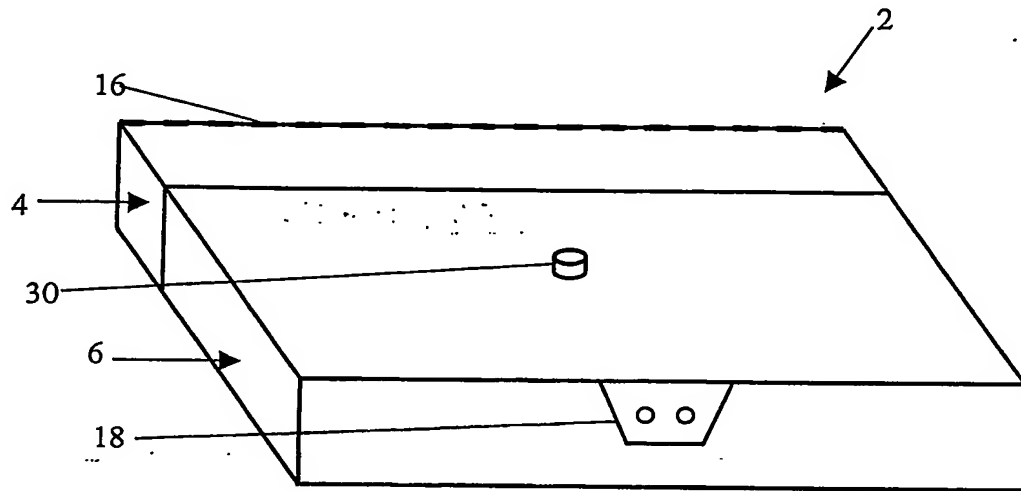


FIG. 1.

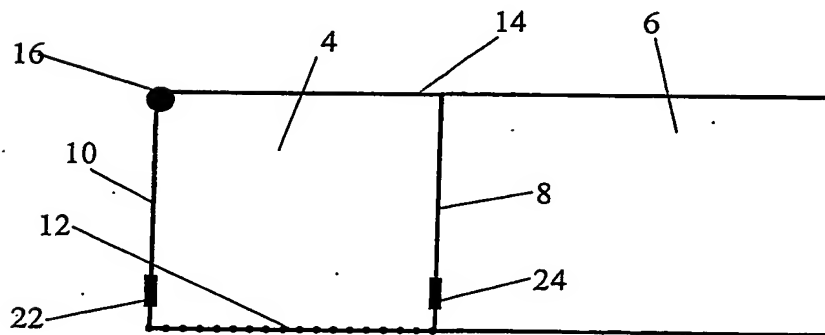


FIG. 2.

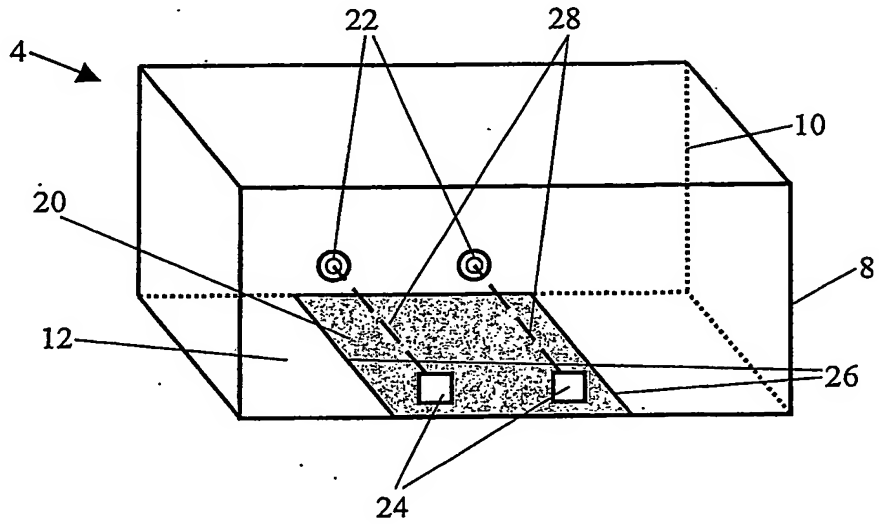


FIG. 3.

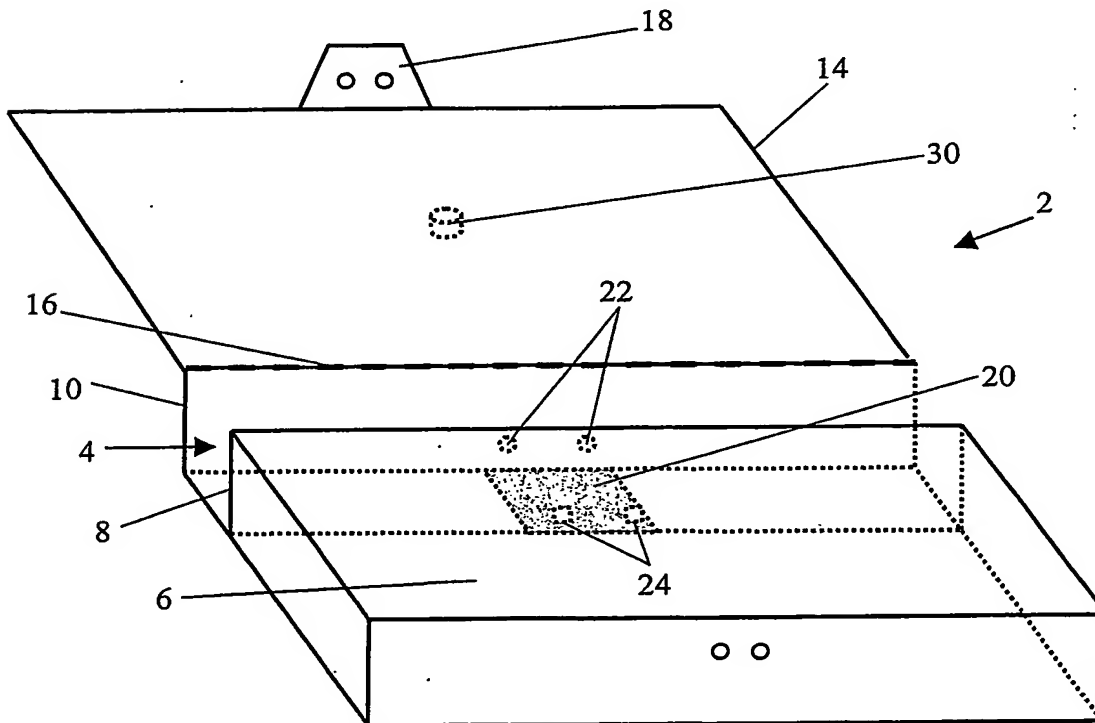


FIG. 4.

**This Page is Inserted by IFW Indexing and Scanning
Operations and is not part of the Official Record**

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

- ☐ BLACK BORDERS
- ☒ IMAGE CUT OFF AT TOP, BOTTOM OR SIDES
- ☒ FADED TEXT OR DRAWING
- ☒ BLURRED OR ILLEGIBLE TEXT OR DRAWING
- ☐ SKEWED/SLANTED IMAGES
- ☐ COLOR OR BLACK AND WHITE PHOTOGRAPHS
- ☒ GRAY SCALE DOCUMENTS
- ☒ LINES OR MARKS ON ORIGINAL DOCUMENT
- ☐ REFERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY
- ☐ OTHER: _____

IMAGES ARE BEST AVAILABLE COPY.

As rescanning these documents will not correct the image problems checked, please do not report these problems to the IFW Image Problem Mailbox.